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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/701,129	11/03/2003	Alvis Lin	41144-8005US	4857

25096 7590 01/30/2006

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EXAMINER
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PEERS, CHASE W

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/701,129	LIN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Chase Peers	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 1/9/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-11 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The submission is in compliance with the provisions of 37 CFR 1.97.  
Accordingly, the examiner is considering the information disclosure statement.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1 and 4 rejected under 35 U.S.C. 102(e) as being anticipated by Kusters et al. (Pat No 6473775).

1. Regarding claim 1, Kusters et al. teaches a product for interfacing with a plurality of file systems and block devices (figure 2), identifying one of more blocks being used (column 2, lines 48-50, and column 8, lines 48-57), creating and handling multiple snapshot instances in a computer storage system (column 5, lines 31-44), creating a snapshot record for each blocks on a base volume at a first time, handling snapshot records of blocks on the base volume at a second time, performing snapshot management functions to blocks on the base volume, allowing writing of data on blocks to free space on the base volume (column 1 line 61 to column 2 line 28).
2. Regarding claim 4, Kusters et al. further claims allocating an unused bit in a counting bitmap to identify the snapshot instance, updating all of the allocated bits in the counting bitmap (column 5, lines 31-44, and column 6, lines 5-19).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 5-8 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Kusters et al. as applied to claim 1 above, and further in view of Eastridge et al. (Pat No 5241668).

3. Regarding claim 2, Kusters et al. discloses identifying blocks called by file systems (column 5, lines 31-44), creating a snapshot record for each identified block (column 8, lines 19-35).

Kusters et al. does not disclose expressly suspending all write operations issued from the file system, and resuming write operations issued from the file system to blocks on the base volume.

Eastridge et al. discloses suspending all write operations issued from the file system, and resuming write operations issued from the file system to blocks on the base volume (column 4, lines 47-57, and column 5, lines 46-56).

Kusters et al. and Eastridge et al. are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the suspending and resuming of write operations from the file system. The suggestion for doing so would have been make sure that the snapshot is precise. Therefore, it would have been obvious to combine Eastridge et al. and Kusters et al. for the benefit of precise snapshots to obtain the invention as specified in claim 2.

The examiner acknowledges that Kusters et al. states that using suspends can cause a large queue of writes, but it should be noted that a small decline in system performance is acceptable in a system where correct snapshots are a necessity.

4. Regarding claim 5, Kusters et al. describes all the limitations found in claim 1 and further teaches updating a counting bitmap (column 5, lines 31-44, and column 6, lines 5-19), allocating free space on the base volume (column 1 line 61 to column 2 line 28), and performing copy-on-write to the allocated block in free space when needed (column 5, lines 31-44, and column 6, lines 52-65)

Kusters et al. does not disclose expressly suspending the write operation to blocks on the base volume and resuming write operations to block on the base volume.

Eastridge et al. discloses suspending all write operations issued from the file system, and resuming write operations issued from the file system to blocks on the base volume (column 4, lines 47-57, and column 5, lines 46-56).

Kusters et al. and Eastridge et al. are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the suspending and resuming of write operations from the file system. The suggestion for doing so would have been make sure that the snapshot is precise. Therefore, it would have been obvious to combine Eastridge et al. and Kusters et al. for the benefit of precise snapshots to obtain the invention as specified in claim 5.

The examiner acknowledges that Kusters et al. states that using suspends can cause a large queue of writes, but it should be noted that a small decline in system performance is acceptable in a system where correct snapshots are a necessity.

5. Regarding claims 6 and 8, Kusters et al. and Eastridge et al. disclose all the limitations found in claims 1 and 5. Kusters et al. further teaches selecting an unused block on the base volume (column 1 line 61 to column 2 line 28), identifying selected block in the snapshot record (column 5, lines 31-44), updating block allocation bitmap and snapshot block allocation bitmap of the file system (column 5, lines 31-44, and column 6, lines 5-19), marking freed blocks as unused ones in both block allocation bitmap and snapshot block allocation bitmap of the file system (column 1 line 61 to column 2 line 28 and column 5, lines 31-44).

Kusters et al. and Eastridge et al. are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the suspending and resuming of write operations from the file system. The suggestion for doing so would have been make sure that the snapshot is precise. Therefore, it would have been obvious to combine Eastridge et al. and Kusters et al. for the benefit of precise snapshots to obtain the invention as specified in claims 6 and 8.

The examiner acknowledges that Kusters et al. states that using suspends can cause a large queue of writes, but it should be noted that a small decline in system performance is acceptable in a system where correct snapshots are a necessity.

6. Regarding claims 10, Kusters et al. discloses all the limitations found in claim 1 and further discloses identifying all copy-on-write blocks associated with said snapshot instance (column 5, lines 31-44), exchanging data on copy-on-write blocks with data on

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the blocks associated with the snapshot instance (column 6, lines 52-65), updating the state of the snapshot record, and updating the block allocation bitmap and snapshot block allocation bitmap of the file system (column 9, lines 21-30).

Kusters et al. does not disclose expressly restraining all write operations issued from the file system to said base volume and restarting write operations of the file system to the base volume.

Eastridge et al. discloses restraining all write operations issued from the file system to said base volume and restarting write operations of the file system to the base volume (column 4, lines 47-57, and column 5, lines 46-56).

Kusters et al. and Eastridge et al. are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the suspending and resuming of write operations from the file system. The suggestion for doing so would have been make sure that the snapshot is precise. Therefore, it would have been obvious to combine Eastridge et al. and Kusters et al. for the benefit of precise snapshots to obtain the invention as specified in claim 10.

The examiner acknowledges that Kusters et al. states that using suspends can cause a large queue of writes, but it should be noted that a small decline in system performance is acceptable in a system where correct snapshots are a necessity.



Claims 7, 9, and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Kusters et al. and Eastridge et al. as applied to claims 1, 5, 6, and 10 above, and further in view of Schneider (Pat No 5175849).

7. Regarding claims 7 and 11, Kusters et al. and Eastridge et al. describe all the limitations in claims 1, 5, 6, and 10 and Kusters et al. further describes dynamic allocating one or more free blocks when the size of the snapshot record grows (column 1 line 61 to column 2 line 28), and marking blocks which are currently used by the product as used in both bitmaps (column 5, lines 31-44, and column 6, lines 5-19).

Kusters et al. and Eastridge et al do not describe expressly freeing allocating blocks when the size of the snapshot shrinks.

Schneider describes expressly freeing allocating blocks when the size of the snapshot shrinks and freeing all blocks being marked as used in the snapshot block allocation bitmap (column 13, lines 2-5).

Kusters et al., Eastridge et al., and Schneider are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the freeing of blocks not being used by the snapshot system. The suggestion for doing so would have been to efficiently use the base volume. Therefore, it would have been obvious to combine Eastridge et al., Kusters et al., and Schneider for the benefit of better base volume usage to obtain the invention as specified in claims 7 and 11.

8. Regarding claim 9, Kusters et al. describes the limitations found in claim 1 and further teaches identifying the counting bit corresponding to said snapshot instance (column 5, lines 31-44, and column 6, lines 5-19) and removing unused record of write operation to its associated block (column 5, lines 31-44, and column 6, lines 52-65).

Kusters et al. does not disclose expressly finding all copy-on-write blocks associated with the snapshot instance, freeing copy-on-write blocks when they have no other snapshot instance to associate with, suspending all write operations issued from the file system to the base volume, and resuming write operations issued from the file system to the base volume.

Eastridge et al. discloses suspending all write operations issued from the file system to the base volume and resuming write operations issued from the file system to the base volume (column 4, lines 47-57, and column 5, lines 46-56).

Eastridge et al. does not disclose expressly finding all copy-on-write blocks associated with the snapshot instance or freeing copy-on-write blocks when they have no other snapshot instance to associate with.

Schneider discloses finding all copy-on-write blocks associated with the snapshot instance and freeing copy-on-write blocks when they have no other snapshot instance to associate with (column 13, lines 2-5).

Kusters et al., Eastridge et al., and Schneider are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the freeing of blocks not being used by the snapshot system. The suggestion for

doing so would have been to efficiently use the base volume. Therefore, it would have been obvious to combine Eastridge et al., Kusters et al., and Schneider for the benefit of better base volume usage to obtain the invention as specified in claim 9.

Kusters et al., Eastridge et al., and Schneider are analogous art because they are from a similar problem solving area, creating and managing snapshots. At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the freeing of blocks not being used by the snapshot system. The suggestion for doing so would have been to efficiently use the base volume. Therefore, it would have been obvious to combine Eastridge et al., Kusters et al., and Schneider for the benefit of better base volume usage to obtain the invention as specified in claim 9.

***Allowable Subject Matter***

Claim 3 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chase Peers whose telephone number is (571) 272-6757. The examiner can normally be reached on from Monday to Friday, 8AM to 4:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**PIERRE BAILLE  
PRIMARY EXAMINER**

1/12/06